

one-fourth mile in width and 20 miles in length from west to east across Chester County, Pa. The towns reporting the most damage were Doe Run, Romansville, and East Downingtown. The route of the storm may be marked from the damaged buildings and lines reported also at Avondale, Exton, Whitford, Thorndale, and Pequea. Much damage was done in Philadelphia. Many people were severely injured.

These storms developed in a narrow belt between unusually warm, moist southerly winds on the east and cold northerly winds on the west.

March 11: A tornado crossed the northwestern part of Louisiana in the vicinity of Gayle, and the Homer Oil Fields, and caused the death of three persons, injured about 35, and destroyed property having an estimated value of about \$100,000. Heavy damage was also reported at Doddsville, Sunflower County, Miss., where six houses were said to have been blown down, two persons killed, and a score injured.

March 12: In Cedar Fork and Leesville townships in the northwestern part of Wake County, near Morrisville, a tornado caused property damage estimated at \$10,000, but without loss of life. The characteristic tornado cloud about 100 feet wide, was seen, and a heavy down-pour followed immediately after its passage. Among the freaks of the storm may be mentioned the loss of one horn by a cow which was uninjured, and the movement of a boy 400 yards through the air without injury to him.

March 17: About 10 miles west of Newport, Ark., a tornado caused injury to a number of people and property damage estimated at \$10,000.

March 20: At Plainville, Adams County, Ill., a tornado of probably small proportions caused some property damage.

March 24: A tornado north of Dayton, Ohio, caused small damage in several villages, but no lives were lost.

A tornado originated about 3.30 p. m., apparently in the eastern part of Maury County, Tenn., about 8 miles northwest of Lewisburg, and traveled northeastward across the northern part of Marshall County. It was most severe and caused the greatest damage at Rich Creek, 10 miles north of Lewisburg, where four persons were killed and one injured. In the vicinity of this place the property damage amounted to \$30,000 or \$40,000,

including the wrecking of five dwellings, four freight cars, and a number of barns and outhouses. Between 4 and 5 o'clock a "destructive wind, rain, and hail storm" was reported in the northern part of Bedford County, doubtless a continuation of the Rich Creek tornado. It reached a point $4\frac{1}{2}$ miles southeast of Murfreesboro, Rutherford County, at 4.30 p. m., having covered a distance of about 40 miles during the hour. One dwelling was destroyed and considerable other damage done in that vicinity. According to reports, a peculiarity developed in the storm at this place in the form of "two tornadoes * * * about 500 yards distant from each other at the same time and houses in between the two were not in the least injured. * * * The two tornadoes were cone shaped and were distinctly observed by a number of residents."

The storm's path was very narrow, being about 100 feet in its early stages and between 30 and 40 feet later. The cloud was said to be small, the accompanying rainfall was light, and the sun was shining on both sides of the storm's path and very near thereto. While no damage seems to have occurred in adjacent counties, there were reports of hail from several places near the point of origin of the tornado.

March 26: A tornado passed over portions of Nobles County, Minn., causing the death of two persons and much property loss.

March 28: A fairly well-developed tornado occurred in the vicinity of Somerville, Somerset County, N. J., causing considerable property damage. One child was killed in a storm in the Bay Ridge section of Brooklyn, N. Y., where a motion-picture theater overturned and much other damage occurred.

March 31: A severe local storm caused considerable damage to wires and outbuildings at Port Arthur, Tex.

A tornado which is reported to have swept across the northern section of Albany, Ga., killed two people and injured several, and caused property damage estimated at from \$200,000 to \$300,000. After leaving Albany the storm did not come down to earth again till about 12 miles northeast of the city, in Worth County, 3 miles southwest of Oakfield, injuring two persons and wrecking several houses and other buildings.

551.515 (73) STORMS AND WEATHER WARNINGS. WEATHER AND CROPS.

EDWARD H. BOWIE, Supervising Forecaster.

WASHINGTON FORECAST DISTRICT.

Special forecasts were made on a number of dates. Of these, the following are mentioned: On the 2d a forecast for fair and considerably colder weather with fresh west and northwest winds was issued for Washington, D. C., on Friday, March 4, when Warren G. Harding was inaugurated President of these United States; on the 24th a special forecast was sent to Lieut. Coney at Pablo Beach, Fla., to the effect that wind and weather were favorable for a start on a trans-America flying trip. Lieut. Coney left after midnight of the 24th, encountered good flying weather, but on account of motor trouble while over northern Louisiana was forced to land and while doing so his machine hit a tree and he was fatally injured.

Storm warnings on Lake Michigan.—Advisory warnings of weather and winds interfering with navigation were issued for Lake Michigan on the 5th, 8th, 12th, 19th, 20th, 24th, 26th, 27th, and 29th of the month. The severest storm of the month occurred on the 26th and

27th, when a disturbance of great intensity moved northeastward from Iowa to Lake Superior, attended by south shifting to west gales with rain and thunderstorms.

Storm warnings on the Atlantic coast.—On the 2d small-craft warnings were displayed on the middle Atlantic and New England coasts; on the 6th southwest storm warnings were displayed at and north of Delaware Breakwater and small-craft warnings south of Delaware Breakwater to Cape Hatteras; on the 9th northwest storm warnings were displayed at and north of Delaware Breakwater; on the 17th and 19th small-craft warnings were displayed on the middle Atlantic and New England coasts; on the 20th southwest storm warnings were displayed at and north of Delaware Breakwater and these warnings were continued through the 21st; on the 24th small-craft warnings were displayed on the middle Atlantic and New England coasts and later on this date the full southwest storm warnings were ordered at and north of Delaware Breakwater; on the 28th northwest storm warnings were displayed on the middle Atlantic and New England coasts. The storms of the night of the 24th and

of the 28th-29th were the severest of the month on the middle Atlantic and New England coasts. No storms of importance occurred on the coast south of Cape Hatteras.

Storm warnings on the East Gulf of Mexico Coast.—Small-craft warnings were displayed in the Pensacola and Mobile districts on the 26th and northwest storm warnings were displayed on the coast at and between Bay St. Louis, Miss., and Cedar Keys, Fla., on the 28th. No severe storm occurred over the East Gulf during the month.

Cold-wave warnings.—Cold-wave warnings were ordered on the 3d for the extreme east portion of upper Michigan; on the 12th for the region of the Great Lakes, the Ohio Valley, and Tennessee; on the 21st for the region of the Great Lakes and the Ohio Valley; on the 26th for the Upper Lake region and the lower Ohio Valley; on the 27th for the region of the Great Lakes, the Ohio Valley, and Tennessee; and on the 28th for the Eastern and Southern States, except Florida. The cold wave of the 27th-29th was the only general cold wave of the month in the Washington forecast district, and coming after a period of abnormally warm weather it was very destructive of fruit bloom and advanced vegetation over a large part of the country east of the Mississippi River.

Frost warnings were issued on a number of days for the States in this forecast district, where vegetation was advanced sufficiently to be subject to damage.

CHICAGO FORECAST DISTRICT.

Although March was one of the warmest months of that name on record in most sections of the Chicago forecast district, warnings of cold waves or freezing temperature were issued quite frequently during the month, the latter being necessary unusually early because of the advanced stage of vegetation in the southern portions of the district, due to the unusual and almost unprecedented warmth.

Cold-wave warnings for limited sections of the district were issued on the 8th, 10th, 11th, 12th, and 15th, while on the 12th were also issued the first warnings for freezing temperature, the advices being sent to Cairo, Ill., and Springfield, Mo.; on the 20th freezing temperature was indicated for Kansas and on the 21st for Kansas, Missouri, and the southern portion of Illinois.

The first cold wave of the month to sweep the district appeared in the Canadian Northwest on the evening of March 25 and during the 26th and 27th spread eastward and southward, bringing with it unseasonable cold, especially from the Rocky Mountain region over the eastern limits of the district. However, warnings for a decided drop in temperature were issued well in advance for all sections. Moreover, on Saturday, the 26th, advices for a severe freeze by Monday morning were sent to Kansas, Missouri, and Illinois, and cold-wave warnings repeated for this area, as well as for Wisconsin and portions of Minnesota and Iowa, on the morning of the 27th. Temperatures considerably below freezing prevailed in the eastern and southern portions of the district on the morning of the 28th and early reports indicate that much damage was done to grain and fruit in Illinois, Missouri, and portions of Iowa and Kansas. Temperatures close to zero or slightly below were registered in the eastern portions of the Dakotas, Minnesota, and northern Wisconsin on the 28th.

Freezing temperature was again indicated for the southern portion of this district on the 30th and 31st, although the ensuing temperatures were not so low as

those experienced during the period from March 27 to 29, inclusive.

Cattle warnings were sent to the stock interests in the northern Rocky Mountain region and western Plains States on the 10th, 11th, and 26th.—*E. H. Haines.*

NEW ORLEANS FORECAST DISTRICT.

Small-craft warnings were displayed on the 20th from Galveston to Velasco, Tex., and were justified.

Southeast storm warnings were issued for the Texas coast on the morning of the 26th and northwest warnings at night on the 27th. Northwest storm warnings were ordered displayed along the Louisiana coast on the morning of the 28th. The storm of the 26th accompanied an inland trough of low pressure and the other warnings were for the area of high pressure that followed. These warnings were verified. No general storm occurred without warnings, but a thundersquall of brief duration occurred in southern Louisiana early in the morning of the 31st and was attended by gales which caused slight damage in the vicinity of Lake Pontchartrain.

The first two decades were unusually mild and vegetation advanced sufficiently by the close of the first decade to require frost warnings, if indicated, for all portions of the district except west Texas. However, no frost worthy of mention occurred during the first 20 days, except on the 10th, when there was frost in Arkansas, the northern portion of east Texas, and extreme northern Louisiana, for which warnings were issued the preceding morning.

A cold-wave warning for the northwestern portion of the district was issued on the 11th but failed of verification, as low pressure persisted west of the Rocky Mountains and the threatening area of high pressure over the northern Rocky Mountain region moved eastward.

A forecast of freezing temperature for northwestern Oklahoma and the Texas Panhandle, issued on the 20th, was fully verified; but the forecast of freezing issued on the 21st, for Oklahoma and northern Arkansas, was verified in part of Oklahoma only. "Possibly frost, if the weather clears," was forecast on the 22d for the northeastern portion of the district; but cloudy weather continued and prevented the formation of frost.

Cold-wave and live-stock warnings were issued on the 26th for northern and western Oklahoma and the Texas Panhandle and were verified. Warnings preceding the further progress of this cold spell, which was extensive, were issued on the 27th and 28th, freezing or lower being forecast on the 27th for the northern sections, except southern Arkansas, and frost and freezing on the 28th for the greater portion of the district. These warnings were verified, except that in east Texas the frost on the 29th did not reach the coast.

Warnings were issued on the 30th for freezing in northern and western Oklahoma and the Texas Panhandle and on the 31st for frost in Arkansas, interior Louisiana, and the northeastern portion of east Texas. These warnings were fully verified.

Fire-weather warnings were sent to the forest supervisors in Oklahoma on the 10th and in Oklahoma and Arkansas on the 26th, and conditions occurred generally as forecast.—*R. A. Dyke.*

DENVER FORECAST DISTRICT.

The month as a whole was considerably warmer and drier than the normal, with lows generally advancing from the north Pacific coast. A notable exception was